

LISTING OF CLAIMS

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

1. (Currently Amended) A solid oxide fuel cell that directly operates with a sulfur-containing hydrocarbon fuel that does not have to undergo prior treatment to remove organic sulfur compounds comprising:
 - (a) a solid electrolyte comprised of an electronic insulator which allows transfer of anions, a ceramic-metal composite anode containing at least ceria, and a cathode, at least the solid electrolyte and anode being prepared ~~together~~ to form a porous anode layer and a dense solid electrolyte layer wherein like particles of the ceramic-metal composite anode and the solid electrolyte are fused together, and then impregnating the porous anode layer with an aqueous solution containing a salt of at least ceria;
 - (b) a fuel comprising a sulfur-containing hydrocarbon having a sulfur content of from about 1 ppm to about 5000 ppm; and
 - (c) an oxygen source.
2. (Original) The fuel cell according to claim 1, wherein the hydrocarbon is a petroleum distillate.
3. (Previously Presented) The fuel cell according to claim 2, wherein the petroleum distillate is selected from the group consisting of gasoline, diesel oil, naphtha, JP-4, JP-5, JP-8, kerosene, motor oil, natural gas, fuel oil, and mixtures thereof.
4. (Previously presented) The fuel cell according to claim 3, wherein the petroleum distillate is selected from the group consisting of JP-4, JP-5, JP-8, and mixtures thereof.
5. (Previously presented) The fuel cell according to claim 3, wherein the petroleum distillate is selected from the group consisting of naphtha, kerosene, fuel oil, and mixtures thereof.

6. (Previously presented) The fuel cell according to claim 3, wherein the petroleum distillate is selected from the group consisting of gasoline, diesel oil, natural gas, and mixtures thereof.
7. (Original) The fuel cell according to claim 2, wherein the hydrocarbon comprises an alcohol.
8. (Previously presented) The fuel cell according to claim 7, wherein the alcohol is selected from the group consisting of methanol, ethanol, and mixtures thereof.
9. (Previously presented) The fuel cell according to claim 2, wherein the hydrocarbon is selected from the group consisting of dry methane, butane, toluene, decane, and mixtures thereof.
10. (Original) The fuel cell according to claim 1, wherein the sulfur-containing hydrocarbon fuel has a sulfur content of from about 1 ppm to about 1000 ppm.
11. (Original) The fuel cell according to claim 10, wherein the sulfur-containing hydrocarbon fuel has a sulfur content of from about 10 ppm to about 1000 ppm.
12. (Original) The fuel cell according to claim 11, wherein the sulfur-containing hydrocarbon fuel has a sulfur content of from about 20 ppm to about 1000 ppm.
13. (Original) The fuel cell according to claim 12, wherein the sulfur-containing hydrocarbon fuel has a sulfur content of from about 100 ppm to about 1000 ppm.
14. (Original) The fuel cell according to claim 13, wherein the sulfur-containing hydrocarbon fuel has a sulfur content of from about 250 ppm to about 1000 ppm.
15. (Previously presented) The fuel cell according to claim 1, wherein the solid electrolyte is an oxide ion conducting material.
16. (Previously presented) The fuel cell according to claim 15, wherein the oxide ion conducting material is selected from the group consisting of doped ceria, doped zirconia, and doped lanthanum gallate.

17. (Previously presented) The fuel cell according to claim 16, wherein the doped ceria is selected from the group consisting of gadolinium doped ceria, samarium-doped ceria, yttria-doped ceria, and mixtures thereof.
18. (Previously presented) The fuel cell according to claim 15, wherein the oxide ion conducting material is yttria-doped zirconia.
19. (Previously presented) The fuel cell according to claim 16, wherein the doped zirconia is scandium-doped zirconia.
20. (Currently Amended) A process of producing electrical energy, comprising:
 - (a) providing a solid oxide fuel cell that directly operates with a sulfur-containing hydrocarbon fuel that does not have to undergo prior treatment to remove organic sulfur compounds comprising a solid oxide electrolyte that is an electronic insulator which allows transfer of anions, a ceramic metal composite anode containing at least ceria and a cathode, at least the solid oxide electrolyte and anode being prepared ~~together~~ to form a porous anode layer and a dense solid electrolyte layer, wherein like particles of the ceramic-metal composite anode and the solid electrolyte are fused together, and then impregnating the porous anode layer with an aqueous solution containing a salt of at least ceria;
 - (b) contacting said cathode with an oxygen source; and
 - (c) contacting said anode with a fuel comprising a sulfur-containing hydrocarbon having a sulfur content of from about 1 ppm to about 5000 ppm.
21. (Original) The process according to claim 20, wherein the hydrocarbon is a petroleum distillate.
22. (Previously presented) The process according to claim 21, wherein the petroleum distillate is selected from the group consisting of gasoline, diesel oil, naphtha, JP-4, JP-5, JP-8, kerosene, motor oil, natural gas, fuel oil, and mixtures thereof.

23. (Previously presented) The process according to claim 22, wherein the petroleum distillate is selected from the group consisting of JP-4, JP-5, JP-8, and mixtures thereof.
24. (Previously presented) The process according to claim 22, wherein the petroleum distillate is selected from the group consisting of naphtha, kerosene, fuel oil, and mixtures thereof.
25. (Original) The process according to claim 22, wherein the petroleum distillate comprises gasoline.
26. (Original) The process according to claim 22, wherein the petroleum distillate comprises diesel oil.
27. (Previously presented) The process according to claim 20, wherein the hydrocarbon is selected from the group consisting of alcohols, dry methanes, butane, toluene, decane, and mixtures thereof.
28. (Original) The process according to claim 27, wherein the hydrocarbon comprises an alcohol.
29. (Previously presented) The process according to claim 28, wherein the alcohol is selected from the group consisting of methanol, ethanol, and mixtures thereof.
30. (Original) The process according to claim 20, wherein the sulfur-containing hydrocarbon has a sulfur content of from about 10 ppm to about 1000 ppm.
31. (Canceled)
32. (Canceled)
33. (Canceled)
34. (Canceled)
35. (Canceled)
36. (Canceled)

37. (Canceled)

38. (Canceled)

39. (Canceled)

40. (Canceled)

41. (Canceled)

42. (Canceled)

43. (Canceled)

44. (Canceled)

45. (Canceled)

46. (Canceled)

47. (Canceled)

48. (Canceled)

49. (Canceled)

50. (Canceled)

51. (Canceled)

52. (Canceled)

53. (Canceled)

54. (Currently Amended) A solid oxide fuel cell that directly operates with a sulfur-containing hydrocarbon fuel that does not have to undergo prior treatment to remove organic sulfur compounds comprising:

- (a) a solid electrolyte comprised of an electronic insulator which allows transfer of anions, a ceramic-metal composite anode containing at least copper, and a cathode, at least the solid electrolyte and anode being prepared ~~together~~ to

form a porous anode layer and a dense solid electrolyte layer wherein like particles of the ceramic-metal composite anode and the solid electrolyte are fused together, and then impregnating the porous anode layer with an aqueous solution containing a salt of at least copper;

- (b) a fuel comprising a sulfur-containing hydrocarbon having a sulfur content of from about 1 ppm to about 5000 ppm; and
- (c) an oxygen source.